

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2012-0061

WASTE DISCHARGE REQUIREMENTS
FOR
CLOSURE AND POST-CLOSURE MAINTENANCE,
BIO INDUSTRIES, INC.
FORMER BIO-REMEDIATION FACILITY FOR PETROLEUM-CONTAMINATED SOILS
TEHAMA COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Central Valley Water Board) finds that:

1. Bio Industries, Inc., a California Corporation (hereafter Discharger), owns and operates a bio-remediation facility for petroleum-contaminated soils (hereafter facility) at 19760 Callahan Road, Tehama County. The facility is on 157 acres, comprising Assessor's Parcel 024-010-15-1, about 2 miles west of Red Bluff in a portion of the northern ½ of Section 22, Township 27 North, Range 4 West, Mount Diablo Baseline and Meridian. The facility is shown in Attachment A, which is incorporated herein and made part of this Order.
2. On 5 June 1998, Central Valley Water Board issued Waste Discharge Requirements Order No. 98-139. Order No. 98-139 no longer accurately describes operations at the facility, and is not consistent with the current policies and regulations of the Central Valley Water Board.
3. On 30 November 2011, in an amended Preliminary Closure and Post-Closure Maintenance Plan (PCPCMP), the Discharger notified the Central Valley Water Board of its intent to close the facility. Central Valley Water Board staff generally concurs with the amended PCPCMP, with the exception of proposed sampling of the inert cell. The attached Monitoring and Reporting Program No. R5-2012-0061, which is incorporated herein and made part of this Order, provides minimum sampling required for the inert cell. This Order is generally consistent with Title 27 California Code of Regulations, Division 2, Chapter 7, Subchapter 2, (Title 27) §21090, *Closure and Post-Closure Maintenance Standards for Disposal Sites*, with modifications that consider site-specific subsurface conditions.
4. The Discharger intends to continue operating a portion of its facility under an Industrial Storm Water Permit. This Order does not regulate discharges under the National Pollutant Discharge Elimination System (NPDES). The Discharger shall apply for such discharge separately, under NPDES General Permit

No. CAS000001. This Order does regulate temporary storage of petroleum-contaminated soils. Find details in *Prohibitions*, below, and in Monitoring and Reporting Program No. R5-2012-0061.

FACILITY OPERATIONS

5. The facility consists of five former soil treatment cells (hereafter former treatment cells), one inert soil cell (hereafter inert cell), and one sedimentation basin. The Discharger intends to use former Treatment Cell 4 for temporary storage of petroleum contaminated soils. The facility covers 15 total acres as shown in Attachment B, which is incorporated herein and made part of this Order. Storm water from treatment cells discharges to surface water. Storm water from the inert cell drains to the sedimentation basin, which has no outlet.
6. For former treatment cells and the inert cell, the Discharger constructed 24-inch thick compacted clay liners, each with maximum permeability of 1×10^{-6} centimeters/second (cm/sec). Liners meet the minimum specifications for a non-municipal solid waste, Class III Landfill as defined in Title 27 §20310.
7. Under Order No. 98-139, the facility accepted soils from sites throughout California. Prior to treatment, soils had petroleum-contamination, with occasional limited anti-freeze, fire-fighting foam, and metals associated with automotive engine wear. The facility accepted non-hazardous soils as defined in Title 27 §20005, et seq. Within treatment cells, the Discharger treated gasoline-contaminated soils primarily by aeration. For diesel-, waste oil-, and motor oil-contaminated soils, the Discharger added moisture and nontoxic nutrients. Post-treatment and after confirmation sampling, the Discharger classified soils as inert, and transferred them to the inert cell.
8. As of 31 March 2010, the facility had about 44,125 total tons of soil in treatment cells, with diesel-contaminated soils comprising about 40% of the total, and gasoline-contaminated soils, mostly unleaded, about 39% of the total. Waste oil- and motor oil-contaminated soils were about 21% of the total.

FACILITY DESCRIPTION

9. The area around the facility has gently rolling hills at elevations ranging about 370 to 470 feet above mean sea level (amsl). Based on local descriptions by the U.S. Department of Agriculture, the facility overlies the Newville Gravelly Loam, a thin, eroded soil with slow drainage.
10. Below the Newville Gravelly Loam is the Pliocene (~2.6 million year-old) Tehama Formation. Based on nearby exposures, the Tehama Formation is mostly clays

and silts in beds about 20 to 50 feet thick, with occasional, weakly cemented, consolidated, sandy gravels in lenses up to about 10 feet thick. The Tehama Formation extends to about 1,500 to 2,000 feet below grade surface (bgs).

11. About two to three miles south of the facility, the active Red Bluff and Corning-Willows Faults offset bedding at about 1,000 feet bgs. Within a 50-year period, local probability is 10% for peak ground acceleration during an earthquake to 0.1g.
12. Land uses within 1,000 feet of the facility are grazing and open space.
13. The facility receives an average of about 22 inches of precipitation per year, most between October and April. Mean evaporation is approximately 70 inches per year based on information from the California Department of Water Resources (DWR). Average annual net evaporation is approximately 48 inches. The 1,000-year, 24-hour precipitation event is 6.46 inches as estimated from DWR Rainfall Analyses for Drainage Design, Bulletin No. 195.
14. The facility is not within a 100-year flood plain based on the Federal Emergency Management Agency flood insurance maps.

SURFACE WATER AND GROUNDWATER CONDITIONS

15. Surface drainage on the facility is in arroyos, which flow north into the locally ephemeral Brickyard Creek. The Brickyard Creek floodplain lies about 500 to 1,000 feet north of treatment cells. Brickyard Creek flows eastward across the Discharger's property, and is tributary to Reeds Creek and the Sacramento River. Brickyard Creek is within Red Bluff Hydrologic Area 504.20.
16. The Basin Plan, on page II-2.00 provides "...beneficial uses of any specifically identified water body generally apply to its tributary." The Basin Plan does not specifically identify beneficial uses for Brickyard Creek, but does identify present and potential uses for the Sacramento River, to which Brickyard Creek and Reeds Creek are tributary. These beneficial uses are; municipal, agricultural, and industrial supply, contact and non-contact water recreation, warm- and cold-freshwater aquatic habitat, migration, spawning, wildlife habitat, and navigation.
17. Within 2,000 feet of the facility, sporadic perched groundwater occurs at various elevations above the Brickyard Creek floodplain, and likely flows from isolated gravels of the Tehama Formation into springs and ponds.

18. The main local water table is no shallower than 60 feet bgs, about 330 feet amsl, deeper than likely short-term infiltration from the Brickyard Creek channel. Based on current information, groundwater at the main water table has a northeast gradient, likely on the order of 0.01, typical for silt. Groundwater velocities range 0.001 to 0.1 feet per year (ft/yr).
19. Groundwater has a background electrical conductivity (EC) ranging between 300 and 400 micromhos/centimeter ($\mu\text{mhos/cm}$), and total dissolved solids (TDS), between 200 and 270 milligrams/Liter (mg/L).
20. The Basin Plan, on page II-3.00 provides "...unless otherwise designated by the Regional Water Board, all ground waters in the Region are considered as suitable, or potentially suitable for municipal and domestic water supply (MUN), agricultural supply (AGR), industrial service supply (IND) and industrial process supply (PRO)." These beneficial uses are applicable to groundwater beneath the facility.

UNSATURATED ZONE, GROUNDWATER, AND SURFACE WATER MONITORING

21. In 2000, the Discharger installed six pressure vacuum lysimeters at about 2 feet beneath the cells, as shown on Attachment B. To date, none have produced any samples. While in part due to mechanical issues, most lack of production likely correlates with high moisture tension of shallow soils.
22. From 1992 to 1999, the Discharger installed six shallow groundwater monitoring wells, and five deeper wells at the facility with air rotary equipment, as shown on Attachment B. Shallow wells target perched groundwater but rarely produce sufficient volume for sampling, and may not sample a common water-bearing unit. Deeper wells may sample more than one distinct hydraulically confined water-bearing unit, and some have filter media intervals that extend far above the targeted water-bearing unit. Extended filter media intervals may allow cross-contamination between shallow and deeper groundwater.
23. Shallow and deep monitoring wells both have shown occasional Total Petroleum Hydrocarbons as diesel (TPH-d), with maximum TPH-d in shallow groundwater of 12,000 micrograms/Liter ($\mu\text{g/L}$); and maximum TPH-d in deeper groundwater of 860 $\mu\text{g/L}$. TPH-d detections are atypical of diesel fuel, and could potentially be due to residual drilling fluids entering filter media. Other organic pollutants have included TPH as oil and grease (TPH-og), Ethylbenzene, Xylenes, and Methyl-tert Butyl Ether (MtBE). TPH-og could also be due to residual drilling fluid. Other pollutants may be due to cross-contamination between perched, and deeper confined groundwater.

24. This Order requires the Discharger to continue monitoring groundwater as required in Monitoring and Reporting Program No. R5-2012-0061 for the next three calendar years, and analyze all pollutant detections in groundwater for their measurable significance, as defined in Title 27 §20164. Unless pollutants are measurably significant during the next three years, this Order will then require the Discharger to provide a work plan for monitoring well destructions under Tehama County Environmental Health Department permit. Measureable significance of analytes could potentially warrant an Evaluation Monitoring Program, as described in Title 27 §20425.
25. The Discharger monitors surface water down-slope of the cells at effluent points E-1 and E-2, in Brickyard Creek at reference points R-1 and R-2, and in the sedimentation basin at SP-1, as shown on Attachment B. Points E-1, E-2, and SP-1 have shown occasional organic pollutants, largely TPH-d and TPH-og. This Order requires the Discharger to continue to monitor surface water under the requirements of the current NPDES permit.

CLOSURE, POST-CLOSURE MAINTENANCE, AND FINANCIAL ASSURANCE

26. In July 1995, the Discharger submitted preliminary financial assurances for the closure and post-closure maintenance in the amount of \$90,960, and assumes clean closure. This Order requires the Discharger to provide updated cost estimates for completing clean closure of the treatment cells based on current inflation factors. Financial assurances must also cover cleanup of reasonably foreseeable releases pursuant to Title 27 §20380.

CEQA AND OTHER CONSIDERATIONS

27. The action to revise waste discharge requirements for this existing facility is exempt from the provisions of the California Environmental Quality Act (CEQA), Public Resource Code §21000, et seq., and the CEQA guidelines, in accordance with Title 14 §15301.

This order implements:

- a. *The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition*; and
- b. The prescriptive standards and performance goals of Chapters 1 through 7, Subdivision 1, Division 2, Title 27, of the California Code of Regulations, effective 18 July 1997, and subsequent revisions.

28. Section 13267(b) of California Water Code provides that: *"In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposed to discharge within its region, or any citizen or domiciliary, or political agency or entity of this state who had discharged, discharges, or is suspected of having discharged or discharging, or who proposed to discharge waste outside of its region that could affect the quality of the waters of the state within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs of these reports, shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports."*
29. The technical reports required by this Order, and the attached "Monitoring and Reporting Program No. R5-2012-0061," are necessary to assure compliance with these waste discharge requirements. The Discharger owns and operates the facility that discharges the waste subject to this Order.

GENERAL FINDINGS

30. This Order solely regulates the management of post-treatment soils in the inert cell to protect beneficial uses of groundwater and surface water that receives discharge from the facility.
31. For the purposes of this Order, 'waste' generally includes soils contaminated with organic constituents normally found in refined fractions of crude oil. Storm water is defined as storm water runoff, surface runoff, and drainage.
32. State Water Resources Control Board Resolution 68-16, *Statement of Policy with Respect to Maintaining High Quality of Waters in California*, requires that the Central Valley Water Board maintain the high quality of waters of the State unless it has been demonstrated that any change will be consistent with the maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial uses of such water, and will not result in water quality less than that prescribed in the policies. Any activity that produces or may produce waste must be required to meet waste discharge requirements that will result in the best practicable treatment or control (BPTC) of the discharge necessary to assure that pollution or nuisance will not occur and that the highest water quality consistent with maximum benefit to the people of the State will be maintained. This Order is consistent with State Board Resolution 68-16. It does not authorize degradation of waters of the State. It prohibits the discharge of waste beyond the facility. It also prohibits the degradation of groundwater and surface water. This Order requires the Discharger to meet requirements that

constitute BPTC. This Order requires the Discharger to meet waste discharge specifications, monitoring and reporting requirements, and other provisions.

33. The provisions of Title 27 require that waste be contained to protect the beneficial uses of surface water and groundwater, and to remediate any release to surface water and groundwater. The Order does not allow the degradation of surface water or groundwater. Therefore, further anti-degradation analysis is not needed.
34. This Order does not authorize violation of any federal, state, or local law or regulation. The requirements prescribed herein do not authorize the commission of any act causing injury to the property of another, nor protect the Discharger from its liabilities under federal, state, or local law.
35. This Order is consistent with Title 27, Division 2, Chapter 7, Subchapter 2, California Code of Regulations that regulate solid waste.

PROCEDURAL REQUIREMENTS

36. All local agencies with jurisdiction to regulate land use, solid waste disposal, air pollution, and to protect public health have approved the use of this site for the discharges of waste to land stated herein.
37. The Central Valley Water Board notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge, and has provided them with an opportunity for a public hearing, and an opportunity to submit their written views and recommendations.
38. The Central Valley Water Board, in a public meeting, heard and considered all comments pertaining to the discharge.
39. Any person affected by this action of the Central Valley Water Board may petition the State Water Resources Control Board to review the action in accordance with § 2050 through 2068, Title 23, California Code of Regulations. The petition must be received by the State Water Resources Control Board, Office of Chief Counsel, P.O. Box 100, Sacramento, California 95812, within 30 days of the date of issuance of this Order. Copies of the laws and regulations applicable to the filing of a petition are available on the Internet at http://www.waterboards.ca.gov/public_notices/petitions/water_quality/ and will be provided on request.

IT IS HEREBY ORDERED, pursuant to §13263 and 13267 of the California Water Code, that Order No. 98-139 is rescinded, and that Bio Industries, Inc., their agents, successors,

and assigns, in order to meet the provisions of Division 7 of the California Water Code and the regulations adopted thereunder, shall comply with the following:

A. PROHIBITIONS

1. The acceptance for treatment of any further soils with petroleum-contaminated soils is prohibited.
2. The temporary storage of petroleum-contaminated soils for a period **exceeding twenty-eight days** is prohibited.
3. The temporary storage of soils with detectable constituents other than petroleum, anti-freeze constituents, fire-fighting foams, and metals typical of automotive engine wear are prohibited. Example prohibited constituents may include, but are not limited to, chlorinated ethenes, chlorinated phenols, polychlorinated biphenyls, pesticides, herbicides, dioxins and furans, and metals other than Cadmium, total Chromium, Lead, Nickel, and Zinc.
4. The temporary storage of hazardous waste or designated waste is prohibited. For the purposes of this Order, the term 'hazardous waste' is as defined in Title 23, California Code of Regulations, §2510 et seq., and 'designated waste' is as defined in Title 27. If such soil has been transported to the facility due to an emergency, appropriate testing must be performed upon delivery. If such testing determines the soil to be either a hazardous or designated waste, the soil shall be removed from the facility immediately upon determination. Appropriate confirmation sampling shall be required to ensure no hazardous or designated wastes remain following removal. The Executive Officer shall concur with the adequacy of such confirmation sampling.
5. The temporary storage of soils with a pH less than or equal to 6, or greater than or equal to 8, is prohibited.
6. The discharge of wastes outside of a treatment cell or inert cell specifically designed for their containment is prohibited.
7. The discharge of waste constituents to the unsaturated zone or to groundwater is prohibited.
8. The discharge of solid or liquid waste to surface waters, surface water drainage courses, or groundwater is prohibited.
9. The temporary storage of waste containing free liquid or moisture in excess of the waste's moisture-holding capacity is prohibited. Free liquid or moisture refers to any liquid, whether petroleum, water, or any other liquid material.

10. The discharge of waste to ponded water from any source is prohibited.
11. The discharge of waste within 100 feet of surface waters is prohibited.
12. The discharge of storm water from treatment cells and the inert cell is prohibited, unless the storm water has been tested and found to contain no petroleum hydrocarbons.

DETECTION MONITORING SPECIFICATIONS

1. The Discharger shall comply with the detection monitoring program provisions of Title 27 for groundwater, surface water, and the unsaturated zone, and in accordance with Monitoring and Reporting Program No. R5-2012-0061.
2. The Discharger shall provide Central Valley Water Board staff a minimum of **one week** notification prior to commencing any field activities related to the installation, repair, or abandonment of monitoring devices.
3. The Discharger shall comply with the Water Quality Protection Standard as specified in this Order, Monitoring and Reporting Program No. R5-2012-0061, and *Standard Provisions and Reporting Requirements for Waste Discharge Requirements for Nonhazardous Solid Waste Discharges Regulated by Title 27 and/or Subtitle D (27 CCR §20005 et seq., and 40 CFR 258, dated January 2012 (Standard Provisions)*, which are hereby incorporated into this Order.
4. The Water Quality Protection Standard for organic compounds that are not naturally occurring and not detected in background groundwater samples shall be taken as the detection limits of the analytical methods used (e.g., U.S. EPA methods 8260B and 8270). The repeated detection of one or more non-naturally occurring organic compounds in samples above the Water Quality Protection Standard from detection monitoring wells is potential evidence of a release from the facility.
5. The concentrations of the constituents of concern in waters passing the Point of Compliance shall not exceed the concentration limits established pursuant to Monitoring and Reporting Program No. R5-2012-0061.
6. For each monitoring event, the Discharger shall determine whether the facility is in compliance with the Water Quality Protection Standard using procedures specified in Monitoring and Reporting Program No. R5-2012-0061 and Title 27 §20415(e).
7. The Discharger shall maintain an approved Sample Collection and Analysis Plan. The Sample Collection and Analysis Plan shall at a minimum include:

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- Sample collection procedures describing purging techniques, sampling equipment, and decontamination of sampling equipment;
- Sample preservation information and shipment procedures;
- Sample analytical methods and procedures;
- Sample quality assurance/quality control (QA/QC) procedures; and
- Chain of Custody control.

D. PROVISIONS

1. The Discharger shall maintain a copy of this Order at the facility and make it available at all times to facility operating personnel, who shall be familiar with its contents, and to regulatory agency personnel.
2. The Discharger shall comply with all applicable provisions of Title 27 that are not specifically referred to in this Order.
3. The Discharger shall comply with Monitoring and Reporting Program No. R5-2012-0061, which is incorporated into and made part of this Order.
4. In the event the Discharger does not comply or will be unable to comply with any prohibition or limitation of this Order for any reason, the Discharger shall notify the appropriate Central Valley Water Board office by telephone **as soon as** it or its agents have knowledge of such noncompliance or potential for noncompliance, and shall confirm this notification in writing **within two weeks**. The written notification shall state the nature, time, and cause of noncompliance, and shall describe the measures being taken to prevent recurrences and shall include a timetable for corrective actions.
5. All reports and transmittal letters shall be signed by persons identified below:
 - a. For a corporation: by a principal executive officer of at least the level of senior vice-president.
 - b. For a partnership or sole proprietorship: by a general partner or the proprietor.
 - c. For a municipality, state, federal or other public agency: by either a principal executive officer or ranking elected or appointed official.

6. A duly authorized representative of a person designated in a, b or c above if;

The authorization is made in writing by a person described in a, b, or c of this provision;

The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator, superintendent, or position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and

The written authorization is submitted to the Central Valley Water Board.

7. Any person signing a document under this Section shall make the following certification:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

8. The Discharger shall take all reasonable steps to minimize any adverse impact to the waters of the State resulting from noncompliance with this Order. Such steps shall include accelerated or additional monitoring as necessary to determine the nature, extent, and impact of the noncompliance.
9. The owner of the facility shall have the continuing responsibility to assure protection of waters of the state from discharged wastes and from gases and leachate generated by discharged waste during the active life, closure, and post-closure maintenance period of the treatment cells and inert cell, and during subsequent use of the property for other purposes.
10. The fact that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with this Order shall not be regarded as a defense for the Discharger's violations of the Order.
11. To assume ownership or operation under this Order, the succeeding owner or operator must apply in writing to the Central Valley Water Board requesting transfer of the Order within 14 days of assuming ownership or operation of this facility. The request must contain the requesting entity's full legal name, the State of incorporation if a corporation, the name, address, and telephone number

of the persons responsible for contact with the Central Valley Water Board, and a statement. The statement shall comply with the signatory requirements contained in Provision F.5. and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code. Transfer of this Order shall be approved or disapproved by the Central Valley Water Board.

12. The Discharger shall establish and maintain an approved cost estimate for initiating and completing corrective action for all known or reasonably foreseeable releases from the facility.
13. The Discharger shall obtain and maintain assurances of financial responsibility for initiating and completing corrective action for all known or reasonably foreseeable releases from the facility in the amount of the approved cost estimate.
14. The Discharger shall update the preliminary closure and post-closure maintenance plan (PCPCMP) any time there is a change that will increase the amount of the closure and post-closure maintenance cost estimate. The updated PCPCMP shall be submitted to the Central Valley Water Board, and the Local Enforcement Agency. The PCPCMP shall meet the requirements of Title 27 §21769(b), and include a lump sum estimate of the cost of carrying out all actions necessary to close each cell, to prepare detailed design specifications, to develop the final closure and post-closure maintenance plan, and to carry out the first thirty years of post-closure maintenance. A final (or partial final) closure and post-closure maintenance plan shall be submitted prior to closure and closure shall not be conducted in the absence of closure WDRs.
15. The Discharger shall obtain and maintain assurances of financial responsibility for closure and post-closure maintenance costs in the amount of the cost estimates in the approved preliminary or final closure and post-closure maintenance plan, as applicable.
16. The Discharger shall complete the tasks contained in these waste discharge requirements in accordance with the following time schedule:

Task

Compliance Date

A. Inert Cell Characterization

Characterize inert cell, as required in Monitoring and Reporting Program No. R5-2012-0061.

Submit report of findings on inert cell.

By 1 November 2012

B. Evaluation Monitoring Program

Develop and submit an Evaluation Monitoring Program to determine the extent of release of petroleum constituents from the facility into the unsaturated zone, groundwater, and surface water.

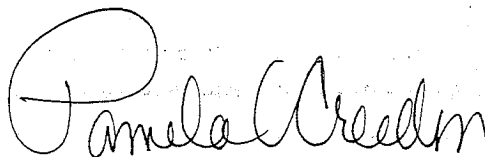
Within 90 days of any measurably significant constituent detection.

C. Monitoring Well Destruction Work Plan

Submit a work plan to destroy groundwater monitoring wells to the Tehama County Environmental Health Department.

Assuming no measurably significant analytical results or other reasons based on characterization of the inert cell, after the next twelve calendar quarters of monitoring.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 8 June 2012.



PAMELA C. CREEDON, Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO R5-2012-0061
FOR
CLOSURE AND POST-CLOSURE MAINTENANCE,
BIO INDUSTRIES, INC.
BIO-REMEDIATION FACILITY FOR PETROLEUM-CONTAMINATED SOILS
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The Discharger shall comply with this Monitoring and Reporting Program, with Title 27, California Code of Regulations, Section 20005, et seq. (hereafter Title 27), and with the *Standard Provisions and Reporting Requirements for Waste Discharge Requirements for Nonhazardous Solid Waste Discharges Regulated by Title 27 and/or Subtitle D (27 CCR §20005 et seq. and 40 CFR 258)*, dated January 2012 (hereafter Standard Provisions), as ordered by Waste Discharge Requirements Order No. R5-2012-0061.

A. REQUIRED MONITORING REPORTS

<u>Report</u>	<u>Due</u>
1. Groundwater Monitoring (Section D)	Semiannually
2. Annual Monitoring Summary Report (Section E)	Annually
3. Unsaturated Zone Monitoring (Section D)	Semiannually
4. Surface Water Monitoring (Section D)	Semiannually
5. Facility Monitoring (Section D)	As necessary
6. Response to a Release (Standard Provisions)	As necessary

B. REPORTING

The Discharger shall submit **semiannual and annual** monitoring reports with the data and information required in this Monitoring and Reporting Program and as required in Order No. R5-2012-0061 and Standard Provisions. Reports that do not comply with the required format will be **REJECTED** and the Discharger shall be deemed to be in noncompliance with the waste discharge requirements. In reporting the monitoring

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data required by this program, the Discharger shall arrange the data in tabular form so that the date, the constituents, the concentrations, and the units are readily discernible. The data shall be summarized in such a manner so as to illustrate clearly the compliance with waste discharge requirements or the lack thereof. Data shall also be submitted in a digital format acceptable to the Executive Officer.

Each monitoring report shall include a compliance evaluation summary as specified in Section E, "Facility Monitoring," below.

Field and laboratory tests shall be reported in each monitoring report. Semiannual and annual monitoring reports shall be submitted to the California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) in accordance with the following schedule for the calendar period in which samples were taken or observations made.

<u>Sampling Frequency</u>	<u>Reporting Frequency</u>	<u>Reporting Periods End</u>	<u>Report Date Due</u>
Monthly	Semiannually	Last Day of Month	<i>Semiannually; see below*</i>
Quarterly	Semiannually	31 March	<i>Semiannually; see below*</i>
	Semiannually	30 June	<i>Semiannually; see below*</i>
	Semiannually	30 September	<i>Semiannually; see below*</i>
	Semiannually	31 December	<i>Semiannually; see below*</i>
Semiannually	Semiannually	30 June	<i>*1 August</i>
		31 December	<i>*1 February</i>
Annually	Annually	31 December	<i>1 February</i>

The Discharger shall submit an **Annual Monitoring Summary Report** to the Central Valley Water Board covering the previous monitoring year. The annual report shall contain the information specified in Section E., "Facility Monitoring," below, and a discussion of compliance with the waste discharge requirements and the Water Quality Protection Standard.

The results of **all monitoring** conducted at the site shall be reported to the Central Valley Water Board in accordance with the reporting schedule above for the calendar period in which samples were taken or observations made.

C. WATER QUALITY PROTECTION STANDARD AND COMPLIANCE PERIOD

1. Water Quality Protection Standard Report

For the facility, the Water Quality Protection Standard shall consist of all constituents of concern, the concentration limit for each constituent of concern, the point of compliance, and all water quality monitoring points for each monitored medium.

The Water Quality Protection Standard for naturally occurring waste constituents consists of the constituents of concern, the concentration limits, and the point of compliance and all monitoring points. The Water Quality Protection Standard, or any modification thereto, shall be submitted in a report for review and approval.

The report shall:

- a. Identify all distinct bodies of surface water and groundwater that could be affected in the event of a release from any treatment cell or the inert cell. This list shall include at least the uppermost aquifer and any permanent or ephemeral zones of perched groundwater underlying the facility.
- b. Include a map showing the monitoring points and background monitoring points for the surface water monitoring program, groundwater monitoring program, and the unsaturated zone monitoring program. The map shall include the points of compliance in accordance with Title 27 §20405.
- c. Evaluate the perennial direction(s) of groundwater movement within the uppermost groundwater zone(s).

A California-Professional Civil Engineer or Geologist shall certify that Water Quality Protection Standards meet requirements of Title 27. If subsequent sampling of the background monitoring point(s) indicates significant water quality changes due to either seasonal fluctuations or other reasons unrelated to waste management activities at the facility, the Discharger may request modification of the Water Quality Protection Standard.

2. Constituents of Concern

Constituents of concern include all the waste constituents, their reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained at the facility. The constituents of concern for the facility are those listed in Table V. The Discharger shall monitor all constituents

of concern every five years, as warranted based on results of analysis of the inert cell, or more frequently as required in accordance with a Corrective Action Program.

3. Monitoring Parameters

Monitoring parameters are constituents of concern that are the waste constituents, reaction products, hazardous constituents, and physical parameters that provide a reliable indication of a release from a treatment cell. The monitoring parameters for the facility are those listed in Tables I through IV for the specified monitored medium.

4. Concentration Limits

For each naturally occurring constituent of concern, the concentration limit shall be determined as follows:

- a. By calculation in accordance with a statistical method pursuant to Title 27 §20415 (e)(8); or
- b. By an alternate statistical method meeting the requirements of Title 27 §20415(e)(8)(E).

5. Point of Compliance

Points of compliance for the water standard at this facility are monitoring wells MW-1, MW-3, and MW-4.

6. Compliance Period

The compliance period for the facility shall be **twelve calendar quarters** following the adoption of this Order. The compliance period is the minimum period during which the Discharger shall conduct a water quality monitoring program subsequent to a release from the facility. The compliance period shall begin anew each time the Discharger initiates an evaluation monitoring program. **At the end the of the compliance period**, the Discharger shall submit a report with appropriate recommendations for either continued monitoring, or destruction of monitoring wells under Tehama County Environmental Health Department permit.

D. MONITORING

The Discharger shall comply with the detection monitoring program provisions of Title 27 for groundwater, surface water, and the unsaturated zone, in

accordance with Detection Monitoring Specifications of Waste Discharge Requirements, Order No. R5-2012-0061. All monitoring shall be conducted in accordance with a Sample Collection and Analysis Plan (Plan). The Plan shall include quality assurance/quality control standards that shall be submitted for review and approval.

All point of compliance monitoring wells established for the detection monitoring program shall constitute the monitoring points for the groundwater Water Quality Protection Standard. All detection monitoring program groundwater monitoring wells, unsaturated zone monitoring devices, and surface water monitoring points shall be sampled and analyzed for monitoring parameters and constituents of concern as indicated and listed in Tables I through V.

Method detection limits and practical quantitation limits shall be reported. All peaks shall be reported, including those that cannot be quantified and/or specifically identified. Metals shall be analyzed in accordance with the methods listed in Table V.

The Discharger may use alternative analytical test methods, including new USEPA approved methods, provided the methods have method detection limits equal to or lower than the analytical methods specified in this Monitoring and Reporting Program.

CHARACTERIZATION OF SOILS IN THE INERT CELL

The Discharger shall drill borings in a pattern as proposed in Figure 1 of the 30 November 2011 amended Preliminary Closure and Post-Closure Maintenance Plan (PCPCMP). A qualified California Professional Engineer or Geologist shall be on-site to directly supervise all fieldwork. The Discharger shall describe, field screen, and collect intact samples of soil, nominally every five feet of penetration as deep as safely feasible without penetrating the liner. For soil screening, sampling, and follow-up laboratory analyses, the Discharger shall use the following protocols:

Describe each soil sample at minimum using the Unified Soil Classification System (USCS). Field-screen soils for visible sheen and volatile organic compounds (VOCs). In addition to qualitatively logging, field screening methods for sheen should at minimum include appropriate fluoroscopy. Field screening methods for VOCs at minimum shall include a photoionization detector (PID), freshly calibrated with isobutylene, installed with a 10.2 or 10.6 electron-volt lamp. For all samples with PID readings greater than 100 parts per million-volume equivalent isobutylene (ppm-v), perform EPA Method 5035 field preservation. From a representative, judgmental selection, minimum 25% of total samples collected, analyze for bulk density and moisture content. Analyses of bulk density and moisture content shall be sufficient to assess distribution of capillary zone pore water within the inert cell.

Analyze all samples for EPA Method 8015 modified gasoline, diesel, and oil and grease (TPH-g, d, and o/g). Based on results of EPA Method 8015, further analyze as follows:

- Further analyze samples with the highest 25% of TPH-g results for Benzene, Toluene, Ethylbenzene, Xylenes, seven fuel oxygenates, Ethylene Dibromide (EDB), and 1,2-Dichloroethene (1,2-DCA) with EPA Method 8260B, and for organic lead with DHS Method 939-M.
- Further analyze samples with PID readings greater than 100 ppm-v for full list EPA Method 8260B.
- Further analyze samples with the highest 25% of TPH-d for poly-aromatic hydrocarbons with EPA Method 8270C.
- Further analyze samples with highest 10% of TPH-og, or identified sheen, for polychlorinated biphenyls with EPA Method 8082.
- Further analyze samples with highest 10% of TPH-og for CAM 17 metals, pH, and oxidation reduction potential (ORP). For samples with at least one metal result greater than its total threshold limit concentration (TTL), if greater than 10 times the related soluble threshold limit concentration (STLC), with the California Waste Extraction Test (WET) using citric acid. Further assess all metals results greater than their individual TTLs in terms of feasible soluble forms, based on related pH and ORP stability.

By 1 November 2012, the Discharger shall submit a report of findings with recommendations for appropriate long-term containment of the inert cell, in compliance with Title 27 §21090 et seq.

GROUNDWATER

The Discharger shall continue to operate and maintain monitoring wells MW-1, MW-2S, MW-2D, MW-3, MW-4, SW-1, SW-2, SW-3, SW-4, SW-5, and SW-6 in compliance with the applicable provisions of Title 27 §20415 and §20420 in accordance with an approved Detection Monitoring Program. The Discharger shall collect, preserve, and transport groundwater samples in accordance with an approved Sample Collection and Analysis Plan for VOCs and SVOCS; see Tables I through V.

The Discharger shall check monitoring parameters of each reporting period for ion balance, and submit major ion results graphically as Stiff diagrams posted at monitoring well locations on water table maps, and other appropriate potentiometric surface maps. To mitigate potential errors in ion balance, the Discharger shall measure pH, electrical conductivity (EC), and temperature in the field, and confirm pH and EC with a follow-up laboratory analyses.

The Discharger shall also measure temperature-compensated specific conductance, convert results to estimated total dissolved solids (TDS); and, by relative percent difference (RPD), compare estimates to independently measured TDS as described in Table I. The Discharger shall analyze for Cadmium, Chromium (total), Nickel, Lead, and Zinc, of both unfiltered and filtered samples. At their discretion, based on major ion balance and RPD, staff may request further analyses. For non-statistical, geochemical analyses of metals anomalies, staff suggests sufficient analyses of Aluminum, Iron, and Manganese to support appropriate covariant plots with other metals results.

Staff considers wells MW-2S and MW-2D as background wells, part of the approved groundwater monitoring system. Samples shall be collected and analyzed for the monitoring parameters in accordance with the methods and **frequency specified in Table I.**

During each groundwater sampling event, the Discharger shall estimate groundwater flow rate and direction in the uppermost aquifer. Subject to further demonstration, staff considers the uppermost aquifer as that sampled in wells MW-2S, MW-3, and MW-4. If perched groundwater, as found sporadically in wells SW-1, SW-2, SW-3, SW-4, SW-5, and SW-6, is of sufficient volume to measure static water level and sample, the Discharger shall also estimate groundwater flow rate and direction in perched groundwater. Staff considers flow rate as mean linear velocity (V); based on representative hydraulic conductivity (K), hydraulic gradient (i), and effective porosity (n_{eff}), $V = Ki/n_{eff}$. The Discharger shall also submit hydrographs based on quarterly soundings of each well with static water levels relative to mean sea level.

UNSATURATED ZONE MONITORING

The Discharger shall continue to monitor with lysimeters LY-1 through LY-6. Assuming sufficient water volume in a lysimeter, the Discharger shall submit samples for VOCs and SVOCs, major ions, specific conductance, pH, TDS, Cadmium, Chromium (total), Nickel, Lead, and Zinc. For metals, the Discharger shall run both filtered and unfiltered samples. Staff suggests further analyses for Iron, Manganese, and Aluminum. With insufficient water volume in a given lysimeter, sampling and the analyses shall be performed in the order listed above until insufficient water volume remains. Samples shall be collected and analyzed for the monitoring parameters in accordance with the methods and **frequency specified in Table II.**

SURFACE WATER MONITORING

The Discharger shall sample surface water in accordance with the current Industrial Storm Water Permit. Unless otherwise required, this will generally entail continued sampling of effluent points E-1 and E-2, storm water points R-1 and R-2, and the sedimentation basin during the first rainy season storm that causes flow, standing water, or drainage into Brickyard Creek, and monthly after all significant rainfall events, greater than or equal to 1 inch in 24 hours. The Discharger shall collect and analyze for monitoring parameters with methods and **frequency specified in Tables III and IV.**

E. FACILITY MONITORING

1. Facility Inspection

Annually, prior to the anticipated rainy season, but no later than **30 September** of each year, the Discharger shall conduct an inspection of the facility. The inspection shall assess damage to the drainage control, and monitoring systems, and shall include the Standard Observations described below. By **15 November** of each year, the Discharger shall submit an annual report describing the results of the inspection and the repair measures implemented, including photographs of the problem and the repairs.

2. Storm Events

The Discharger shall inspect all precipitation, diversion, and drainage facilities for damage **within 7 days** following *major storm events*. Necessary repairs shall be completed **within 30 days** of the inspection. The Discharger shall report any damage and subsequent repairs within 45 days of completion of the repairs, including photographs of the problem and the repairs.

REPORTING REQUIREMENTS

1. The Discharger shall retain records of all monitoring information, including all calibration and maintenance records, all original strip chart recordings of continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order. Records shall be maintained throughout the life of the facility including the post-closure period.

Such legible records shall show the following for each sample:

- Sample identification and the monitoring point or background monitoring point from which it was taken, along with the identity of the individual who obtained the sample;
- Date, time, and manner of sampling;

- Date and time that analyses were started and completed, and the name of the personnel and laboratory performing each analysis;
 - Complete procedure used, including method of preserving the sample, and the identity and volumes of reagents used;
 - Calculation of results; and
 - Results of analyses, and the MDL and MRL for each analysis.
2. A transmittal letter explaining the essential points shall accompany each report. At a minimum, the transmittal letter shall identify any violations found since the last report was submitted, and if the violations were corrected. If no violations have occurred since the last submittal, this shall be stated in the transmittal letter. The transmittal letter shall also state that a discussion of any violations found since the last report was submitted, and a description of the actions taken or planned for correcting those violations, including any references to previously submitted time schedules, is contained in the accompanying report.

Each monitoring report shall include a compliance evaluation summary. The summary shall contain at least:

- For each monitoring point and background monitoring point addressed by the report, a description of:
 - The time of water level measurement;
 - The type of pump - or other device - used for purging and the elevation of the pump intake relative to the elevation of the screened interval;
 - The method of purging (the pumping rate; the equipment and methods used to monitor field pH, temperature, and conductivity during purging; the calibration of the field equipment; results of the pH, temperature, conductivity, and turbidity testing; and the method of disposing of the purge water) to remove all portions of the water that was in the well bore while the sample was being taken;
 - The type of pump - or other device - used for sampling, if different than the pump or device used for purging; and
 - A statement that the sampling procedure was conducted in accordance with the approved Sampling and Analysis Plan.
 - A map or aerial photograph showing the locations of observation stations, monitoring points, and background monitoring points.

- For each groundwater body, a description and graphical presentation of the gradient and direction of groundwater flow beneath the facility, and the groundwater flow rate, based upon water level elevations taken prior to the collection of the water quality data submitted in the report.
 - Laboratory statements of results of all analyses evaluating compliance with requirements.
 - An evaluation of the effectiveness of the leachate monitoring and controls, and of the run-off/run-on controls.
 - A summary and certification of completion of all **Standard Observations** for the treatment cells, for the perimeter of the cell, and for the receiving waters. Standard observations for active treatment cells shall be conducted **weekly** during the wet season (1 October to 30 April of each year) and **monthly** during the dry season (1 May to 30 September of each year). Standard Observations shall include:
- For Former Treatment Cell 4, the following shall be reported:
 - Observation or other evidence of ponded water at any point in the cell shall be reported, and the location shown on an appropriate map;
 - Detection of odors beyond the boundaries of the cell - presence or absence, characterization, source, and distance of travel from source; and
 - Evidence of erosion of the cell containment structure.
- Along the Perimeter of the Facility:
 - Observation of other evidence of liquid leaving or entering the facility, estimated size of the affected area, and flow rate (show affected area on an appropriate map);
 - Evidence of odors - presence or absence, characterization, source, and distance of travel from source; and
 - Signs of erosion.
- For Receiving Waters:
 - Discoloration and turbidity - description of color, source, and size of affected area;

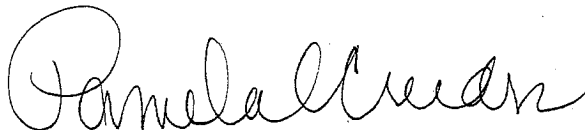
- Detection of odors - presence or absence, characterization, source, and distance of travel from source;
 - Evidence of water uses - presence of water-associated wildlife;
 - Flow rate; and
 - Weather conditions - wind direction and estimated velocity, total precipitation during recent days and on the day of observation.
3. The Discharger shall report by telephone any seepage from the facility **immediately** after it is discovered. A written report shall be filed with the Central Valley Water Board **within seven days**, containing at least the following information:
- A map showing the location(s) of seepage;
 - An estimate of the flow rate;
 - A description of the nature of the discharge (e.g., all pertinent observations and analyses);
 - Verification that samples have been submitted for analyses of the Monitoring Parameters and Constituents of Concern listed in Table III of this MRP, and an estimated date that the results will be submitted to the Regional Water Board; and
 - Corrective measures underway or proposed, and corresponding time schedule.
4. The Discharger shall submit an **Annual Monitoring Summary Report** to the Regional Water Board covering the reporting period of the previous monitoring year. This report shall contain:
- All monitoring parameters and constituents of concern shall be graphed so as to show historical trends at each monitoring point and background monitoring point, for all samples taken within at least the previous five calendar years. Each such graph shall plot the concentration of one or more constituents for the period of record for a given monitoring point or background monitoring point, at a scale appropriate to show trends or variations in water quality. The graphs shall plot each datum, rather than plotting mean values. For any given constituent or parameter, the scale for background plots shall be the same as that used to plot down-gradient data. Graphical analysis of monitoring data may be used to provide significant evidence of a release.
 - All historical monitoring data, including data for the previous year, shall be submitted in tabular form as well as in a digital file format. The Regional

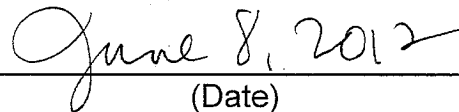
Water Board regards the submittal of data in hard copy and in digital format as "...the form necessary for..." statistical analysis [Title 27 §20420(h)], in that this facilitates periodic review by the Regional Water Board.

- A comprehensive discussion of the compliance record, and the result of any corrective actions taken or planned that may be needed to bring the Discharger into full compliance with the waste discharge requirements.
- A map showing the area and elevations in which filling has been completed during the previous calendar year and a comparison to final closure design contours.
- A written summary of the monitoring results, indicating any changes made or observed since the previous annual report.

The Discharger shall implement the above monitoring program on the effective date of this Program.

Ordered by:


PAMELA C. CREEDON, Executive Officer


(Date)

EJR: jmtm

TABLE I
DETECTION MONITORING PROGRAM, GROUNDWATER (ROUTINE)

<u>Parameter</u>	<u>Units</u>	<u>Frequency</u>
Field Parameters		
Groundwater Elevation	Ft. & hundredths, M.S.L.	Quarterly
Temperature	°C	Quarterly
Electrical Conductivity	µmhos/cm	Quarterly
pH	pH units	Quarterly
Eh	millivolts	Quarterly
Dissolved Oxygen	mg/L	Quarterly
Turbidity	Nephelometric Turbidity Units, Quarterly	
Monitoring Parameters		
Total Dissolved Solids (TDS)	mg/L	Quarterly
Bicarbonate	mg/L and meq/L	Quarterly
Carbonate	mg/L and meq/L	Quarterly
Chloride	mg/L and meq/L	Quarterly
Sulfate	mg/L and meq/L	Quarterly
Calcium	mg/L and meq/L	Quarterly
Magnesium	mg/L and meq/L	Quarterly
Potassium	mg/L and meq/L	Quarterly
Sodium	mg/L and meq/L	Quarterly
Cadmium	mg/L	Quarterly
Chromium (total)	mg/L	Quarterly
Lead	mg/L	Quarterly
Nickel	mg/L	Quarterly
Zinc	mg/L	Quarterly
Total Petroleum Hydrocarbons		
as gasoline, diesel, and oil and grease	mg/L	Quarterly
Volatile Organic Compounds	µg/L	Quarterly
(USEPA Method 8260, key petroleum constituents; see Table IV)		
Semi-Volatile Organic Compounds	µg/L	Quarterly
(USEPA Method 8270C, key petroleum constituents; see Table IV)		

TABLE II

DETECTION MONITORING PROGRAM, UNSATURATED ZONE (ROUTINE)

SOIL GAS PROBES, AS REQUIRED BASED ON FINDINGS OF INERT CELL CHARACTERIZATION:

<u>Parameter</u>	<u>Units</u>	<u>Frequency</u>
Monitoring Parameters		
Volatile Organic Compounds (USEPA Method TO-15, key petroleum constituents; see Table IV)	µg/cm ³ and ppb-v	Semiannually

LYSIMETERS:

Parameter

Field Parameters

Electrical Conductivity	µmhos/cm	Semiannually
pH	pH units	Semiannually

Monitoring Parameters

Total Dissolved Solids (TDS)	mg/L	Semiannually
Bicarbonate	mg/L and meq/L	Semiannually
Carbonate	mg/L and meq/L	Semiannually
Chloride	mg/L and meq/L	Semiannually
Sulfate	mg/L and meq/L	Semiannually
Calcium	mg/L and meq/L	Semiannually
Magnesium	mg/L and meq/L	Semiannually
Potassium	mg/L and meq/L	Semiannually
Sodium	mg/L and meq/L	Semiannually
Cadmium	mg/L	Semiannually
Chromium (total)	mg/L	Semiannually
Lead	mg/L	Semiannually
Nickel	mg/L	Semiannually
Zinc	mg/L	Semiannually
Total Petroleum Hydrocarbons (USEPA Method 8015M) as gasoline, diesel, and oil and grease	mg/L	Semiannually
Volatile Organic Compounds (USEPA Method 8260B, key petroleum constituents, Table IV)	µg/L	Semiannually
Semi-Volatile Organic Compounds (USEPA Method 8270C, key petroleum constituents, Table IV)	µg/L	Semiannually

TABLE III
SURFACE WATER DETECTION MONITORING PROGRAM (ROUTINE)

As required in the current Industrial Storm Water Permit.

TABLE IV
MONITORING PARAMETERS FOR DETECTION MONITORING, KEY PETROLEUM (ROUTINE)

ALL GROUNDWATER AND SOIL SAMPLES:

VOCs, key petroleum constituents,

USEPA Method 8260B

Benzene
n-Butylbenzene
sec-Butylbenzene
Ethylbenzene
Isopropylbenzene
Toluene
1,2,4-Trimethylbenzene
1,3,5-Trimethylbenzene
Total Xylenes
Ethanol (EtOH)
Methanol (MeOH)
Di-isopropylether (DIPE)
Ethyl tertiary butyl ether (EtBE)
Methyl tertiary butyl ether (MtBE)
Tertiary amyl methyl ether (TAME)
Tertiary butyl alcohol (TBA)
Ethylene Dibromide (EDB)
Ethylene Dichloride (1,2-Dichloroethane)
Naphthalene

SVOCs, key petroleum constituents,

USEPA Method 8270C

Acenaphthene
Anthracene
Benz(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(j)fluoranthene
Benzo(k)fluoranthene
Chrysene

MONITORING AND REPORTING PROGRAM NO. R5-2012-0061
CLOSURE AND POST-CLOSURE MAINTENANCE,
BIO INDUSTRIES, INC.
FORMER BIO-REMEDIATION FACILITY FOR PETROLEUM-CONTAMINATED SOILS
TEHAMA COUNTY

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Dibenz(a)acridine
Dibenz(h)acridine
Dibenz(a,h)acridine
7H-Dibenzo(c,g)carbazole
Dibenzo(a,e)pyrene
Dibenzo(a,h)pyrene
Dibenzo(a,l)pyrene
7,12-Dimethylbenz(a)anthracene
1,6-Dinitropyrene
1,8-Dinitropyrene
Fluoranthene
Fluorene
Indeno(1,2,3-c,d)pyrene
3-Methylcholanthrene
5-Methylchrysene
2-Methylnaphthalene
5-Nitroacenaphthene
6-Nitrocrysene
2-Nitrofluorene
1-Nitropyrene
4-Nitropyrene
Pyrene

**SOIL GAS SAMPLES, AS REQUIRED BASED ON FINDINGS OF INERT CELL
CHARACTERIZATION:**

VOCs, key petroleum constituents

USEPA METHOD TO-15

Benzene
Toluene
Ethylbenzene
total Xylenes
Ethanol (EtOH)
Methanol (MeOH)
Di-isopropylether (DIPE)
Ethyl tertiary butyl ether (EtBE)
Methyl tertiary butyl ether (MtBE)
Tertiary amyl methyl ether (TAME)
Tertiary butyl alcohol (TBA)
Naphthalene

TABLE V

**CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS
 (EVERY FIVE YEARS, AS REQUIRED BASED ON FINDINGS OF INERT CELL
 CHARACTERIZATION)**

Inorganics (dissolved):

USEPA Method

Aluminum	6010
Barium	6010
Beryllium	6010
Chromium	6010
Cobalt	6010
Copper	6010
Iron	6010
Manganese	6010
Silver	6010
Tin	6010
Vanadium	6010
Zinc	6010
Antimony	7041
Arsenic	7062
Lead	7421
Nickel	7521
Selenium	7742
Thallium	7841
Cadmium	7131A
Mercury	7470A
Cyanide	9010B
Sulfide	9030B

Volatile Organic Compounds

**USEPA Method 8260, and Method TO-15 AS REQUIRED BASED ON FINDINGS OF
 INERT CELL CHARACTERIZATION**

Acetone
Benzene
Bromodichloromethane (Dibromochloromethane)
Bromoform (Tribromomethane)
Bromomethane
2-Butanone (MEK)
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane (Ethyl chloride)
Chloroform (Trichloromethane)
Chloroethane
Chloromethane
Dibromochloromethane (Chlorodibromomethane)
1,2-Dibromoethane (Ethylene dibromide; EDB)

MONITORING AND REPORTING PROGRAM NO. R5-2012-0061
CLOSURE AND POST-CLOSURE MAINTENANCE,
BIO INDUSTRIES, INC.
FORMER BIO-REMEDIATION FACILITY FOR PETROLEUM-CONTAMINATED SOILS
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o-Dichlorobenzene (1,2-Dichlorobenzene)
m-Dichlorobenzene (1,3-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
1,1 -Dichloroethane (Ethylidene chloride)
1,2-Dichloroethane (Ethylene dichloride)
1,1 -Dichloroethylene (1, 1-Dichloroethene; Vinylidene chloride)
cis- 1,2-Dichloroethylene (cis- 1,2-Dichloroethene)
trans- 1,2-Dichloroethylene (trans- 1,2-Dichloroethene)
1,2-Dichloropropane (Propylene dichloride)
1,1 -Dichloropropene
cis- 1,3-Dichloropropene
trans- 1,3-Dichloropropene
Di-isopropylether (DIPE)
Ethanol
Ethyltertiary butyl ether (EtBE)
Ethylbenzene
2-Hexanone (Methyl butyl ketone)
Methyl chloride (Chloromethane)
Methyl ethyl ketone (MEK; 2-Butanone)
Methyl tertiary butyl ether (MtBE)
4-Methyl-2-pentanone (Methyl isobutyl ketone)
Naphthalene
Styrene
Tertiary amyl methyl ether (TAME)
Tertiary butyl alcohol (TBA)
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene; PCE)
Toluene
1,2,4-Trichlorobenzene
1,1,1 -Trichloroethane, Methylchloroform
1,1,2-Trichloroethane
Trichloroethylene (Trichloroethene; TCE)
Trichlorofluoromethane (CFC- 11)
Trichlorofluoroethane (CFC- 113)
Vinyl chloride (Chloroethene)
Xylenes

Semi-Volatile Organic Compounds

USEPA Method 8270

Acenaphthene
Acenaphthylene
Anthracene
Benzo[a]anthracene (Benzanthracene)
Benzo[b]fluoranthene
Benzo[k]fluoranthene
Benzo[g,h,i]perylene
Benzo[a]pyrene
Bis(2-ethylhexyl) phthalate

Butyl benzyl phthalate (Benzyl butyl phthalate)
p-Chloro-m-cresol (4-Chloro-3-methylphenol)
2-Chlorophenol
Chrysene
Cresols
Dibenz[a,h]anthracene
Di-n-butyl phthalate
2,4-Dichlorophenol
2,6-Dichlorophenol
Diethyl phthalate
7,12-Dimethylbenz[a]anthracene
2,4-Dimethylphenol (m-Xylenol)
Dimethyl phthalate
Di-n-octyl phthalate
Fluoranthene
Fluorene
Indeno(1,2,3-c,d)pyrene
o-Nitrophenol (2-Nitrophenol)
p-Nitrophenol (4-Nitrophenol)
Pentachlorophenol
Phenanthrene
Phenol
Pyrene
Tetrachlorophenols
Trichlorophenols

INFORMATION SHEET

CLOSURE AND POST-CLOSURE MAINTENANCE,
BIO INDUSTRIES, INC.
FORMER BIO-REMEDIATION FACILITY FOR PETROLEUM-CONTAMINATED
SOILS
TEHAMA COUNTY

On 21 June 1996, the California Regional Water Quality Control Board Central Valley Region (Central Valley Water Board) originally issued Waste Discharge Requirements Order No. 96-184 to Bio Industries, Inc. (Discharger). On 5 June 1998, the Central Valley Water Board rescinded the 1996 Order, and adopted Waste Discharge Requirements Order No. 98-139. This Order rescinds and replaces Order No. 98-139.

Facility Operations

On 30 November 2011, Bio Industries, Inc. notified the Central Valley Water Board, Central Valley Region, of its intent to close its facility at 19760 Callahan Road, Red Bluff, Tehama County. There, the Discharger accepted soils with petroleum-contamination, occasionally also with minor anti-freeze, fire-fighting foam, and metals associated with automotive engine wear. Typical sources were underground storage tank excavations and emergency cleanups of motor vehicle accidents. The facility accepted non-hazardous soils as defined in Title 27 California Code of Regulations Division 2, §20005, et seq. (Title 27). The facility did not accumulate soils in concentrations that constitute designated waste as defined in Title 27. The facility treated gasoline-contaminated soils primarily by aeration. For other soils, the Discharger added moisture and non-toxic nutrients. Attachment A is a map of the facility location and surrounding parcels.

The Discharger treated contaminated soils in five cells, and then disposed of soils that meet criteria for inert waste into an inert cell. The Discharger plans to continue using former Treatment Cell 4 for temporary storage of polluted soils under an Industrial Storm Water Permit. Both the former treatment cells and the inert cell have compacted clay liners with a minimum thicknesses of 24 inches and a maximum permeabilities of 1×10^{-6} centimeters per second. Storm water drainage from former treatment cells flows to surface water. Cells 1, 4, and 5 have eastward draining valves that discharge to arroyos up-slope of surface water effluent sampling points. Cells 3 and 2 internally drain into Cell 1 through open pipes. The inert cell drains through ditches to a sedimentation basin, which has no outlet. Attachment B is a map of cells and storm water management and monitoring features.

Unsaturated Zone Monitoring

In 2000, the Discharger installed pressure-vacuum lysimeters LY-1 through LY-6 about two feet beneath the cells. To date, no lysimeter has produced a sample. Therefore, in October 2009, prior to heavy seasonal rains, the Discharger primed lysimeters with distilled water. Four lost all recoverable water likely due to low native soil moisture.

Groundwater Monitoring

From 1992 to 1999, the Discharger installed shallow groundwater monitoring wells, SW-1 through SW-6, and deeper monitoring wells, MW-1, MW-2S, MW-2D, MW-3, and MW-4. Table 1, below, summarizes monitoring well constructions, based on available public agency records. Recent field investigations indicate that at least some of these records are inaccurate.

Shallow wells target perched groundwater but rarely produce sufficient volume for sampling, and may not sample a common water-bearing unit. While they have a common terminal depth of 10 feet bgs, topographic relief among shallow wells is about 14 feet. Deeper wells MW-1 and MW-2D, have hydraulically confined open and slotted casing intervals, and may sample two distinct water-bearing units. Wells MW-2S, MW-3, and MW-4 also have confined slotted casing intervals, but with likely unconfined filter media intervals that extend far above targeted water bearing units. While hydraulic gradients are uncertain, the Discharger currently considers wells MW-1, MW-3, and MW-4 as points of compliance, and wells MW-2S and MW-2D as background wells.

Table 1, Monitoring Well Constructions, Bio Industries, Inc., Red Bluff, Tehama County

Well	Date Installed	TOC elevation (feet amsl)	22 Apr 09 SWLs (feet amsl)	Screened or Open Interval (feet bgs)	Filter Media Interval (feet bgs)
SW-1	May-92	417.29	Dry	5 to 10	5 to 10
SW-2	May-92	427.50	Dry	5 to 10	5 to 10
SW-3	May-92	406.96	Dry	5 to 10	5 to 10
SW-4	May-92	408.93	Dry	5 to 10	5 to 10
SW-5	May-92	420.58	Dry	5 to 10	5 to 10
SW-6	no data	not surveyed	Dry	5 to 10	5 to 10
MW-1	Apr-92	417.33	338.06	159 to 160	None
MW-2S	May-92	444.36	348.78	110 to 120	5 to 121
MW-2D	May-92	444.36	337.23	155 to 165	126 to 165
MW-3	May-92	407.14	338.54	126 to 136	5 to 136
MW-4	Dec-99	431.63	344.63	105? To 120	6 to 120

Notes:

1. Well construction data based on applications and well drillers' reports on file at Tehama County Environmental Health Department and California Department of Water Resources. Static water levels are from Discharger's quarterly monitoring data.
2. TOC, top of casing, SWL, static water level, amsl, above mean sea level. Casing stick-up is about 3 feet above grade.
3. Based on well driller's report, MW-1 appears to be an open-hole completion below steel riser pipe. All other wells have 0.010-inch slotted PVC casing and #3 filter sand.
4. Estimated top of screened interval in MW-4 based on proposed construction, 26 Oct 09.

Based on public records summarized in Table 1, filter media likely provides a conduit between perched a deeper groundwater in deep monitoring wells. However, based on observations during trenching near the wellhead of well MW-3, November 2012, and follow-up interviews with the driller, filter media does not extend to 5 feet bgs. A six-inch diameter steel driven casing likely extends to about 20 feet bgs, with concrete-based grout within the annulus between the PVC riser and casing, at minimum from grade to about 9 feet bgs. Top of filter media is unknown.

Table 2 summarizes petroleum pollutants in groundwater. Although not detected in groundwater, the table also shows Total Petroleum Hydrocarbons as gasoline (TPHg) and tert Amyl Ethyl Ether (TAME), due to their detections in surface water.

Table 2, Petroleum Constituents in Groundwater, Bio Industries, Inc., Red Bluff, Tehama County

All data in micrograms/Liter (µg/L)

Well	Date	TPHg	TPHd	TPH o&g	Benzene	Toluene	Ethylbenzene	Xylenes	MtBE	TAME
MW-1	1/11/2003	<50	350	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	NA
	4/13/2004	<50	<50	5.1	<0.3	<0.3	<0.5	<0.5	<0.5	<0.5
	10/6/2004	<50	65	<5.0	<0.3	<0.3	<0.5	<0.5	<0.5	<0.5
MW-2S	4/1/1997	<50	<50	<5.0	<0.5	<0.5	0.73	1.9	NA	NA
	11/1/2003	<50	12000	<5.0	<0.5	<0.5	<0.5	<0.5	NA	NA
	2/4/2003	NA	210	NA	NA	NA	NA	NA	NA	NA
	10/11/2007	<50	1900	<1.0	<0.5	<0.5	<0.5	<0.1	<0.5	<10
	4/22/2009	<50	<50	1.1	<0.5	<0.5	<0.5	<0.1	<0.5	<10
MW-2D	1/11/2003	NA	NA	20	NA	NA	NA	NA	NA	NA
	2/4/2003	NA	88	NA	NA	NA	NA	NA	NA	NA
	10/6/2004	<50	66	<5.0	<0.3	<0.3	<0.5	<0.5	<0.5	<0.5
	4/22/2009	<50	<50	1.3	<0.5	<0.5	<0.5	<0.1	<0.5	<10
	5/13/2009	NA	NA	1.2	NA	NA	NA	NA	NA	NA
MW-3	1/11/2003	<50	860	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	NA
	2/4/2003	NA	130	NA	NA	NA	NA	NA	NA	NA
	10/6/2004	<50	73	<5.0	<0.3	<0.3	<0.5	<0.5	<0.5	<0.5
	4/22/2009	<50	<50	2.5	<0.5	<0.5	<0.5	<0.1	<0.5	<10
MW-4	3/14/2001	<50	<50	NA	<0.5	<0.5	<0.5	<0.5	9.6	NA
	1/11/2003	<50	260	7	<0.5	<0.5	<0.5	<0.5	<0.5	NA
	5/17/2006	<50	<50	1	<0.5	<0.5	<0.5	<0.1	<0.5	<10
	4/10/2008	<50	<50	1	<0.5	<0.5	<0.5	<0.1	<0.5	<10

Notes:

1. Data from the Discharger's 2009 Annual Monitoring Report dated 18 January 2010, by Lawrence and Associates, Shasta Lake City, Shasta County
2. Total petroleum hydrocarbons, as gasoline, diesel, and oil and grease, TPHg, TPHd, and TPHo&g, Methyl tert Butyl Ether, MtBE, tert Amyl Methyl Ether, TAME
3. NA, no analysis.

As shown in the above table, petroleum constituents occur occasionally in both shallow and deeper wells. While records may be inaccurate, staff considers the occasional detections of volatile organic compounds as due to cross-contamination in poorly constructed monitoring wells. Based on interviews with the well driller, and reviews of analytical results, staff considers TPH detections as possibly due to residual lifting foam and lubricants (cooking oil) used during air-rotary drilling of pilot borings.

Surface Water Monitoring

As shown on Attachment B, the Discharger monitors surface water down-slope of treatment cells effluent points E-1 and E-2, at reference points in Brickyard Creek at R-1 and R-2, and in the sedimentation basin at SP-1. Points E-1, E-2, and SP-1 have shown occasional dilute organic pollutants, largely TPH-d and TPH-og. To date R-1 and R-2 have shown no pollutants. Table 3 summarizes detections.

Table 3, Petroleum Constituents in Surface Water, Bio Industries, Inc., Red Bluff, Tehama County
All data in micrograms/Liter (µg/L)

Sample Point	Date	TPHg	TPHd	TPHo&g	Benzene	Toluene	Ethylbenzene	Xylenes	MtBE	TAME
E-1	2/25/2004	<50	<50	<5.0	<0.5	<0.5	<0.5	<0.1	<0.5	1.5
	12/26/2006	<50	<50	1.4	<0.5	<0.5	<0.5	<1	<5	<5
	2/15/2009	<50	<50	1.5	<0.5	<0.5	<0.5	<1	<5	<5
	10/14/2009	<50	<50	1.1	<0.5	<0.5	<0.5	<1	<5	<5
E-2	12/26/2006	<50	<50	1.4	<0.5	<0.5	<0.5	<1	<5	<5
	2/9/2007	<50	<50	1.1	<0.5	<0.5	<0.5	<1	<5	<5
	2/15/2009	<50	<50	1.6	<0.5	<0.5	<0.5	<1	<5	<5
	10/14/2009	<50	<50	1	<0.5	<0.5	<0.5	<1	<5	<5
SP-1	10/6/2004	<50	63	<5.0	<0.3	<0.3	<0.5	<0.5	<0.5	<0.5
	4/10/2008	<50	2400	4.6	<0.5	<0.5	<0.5	<1	<5	<5
	4/22/2009	<50	<50	3.1	<0.5	<0.5	<0.5	<1	<5	<5
	5/13/2009	<50	<50	1.4	<0.5	<0.5	<0.5	<1	<5	<5

Notes:

1. Data from the Discharger's 2009 Annual Monitoring Report dated 18 January 2010, by Lawrence and Associates, Shasta Lake City, Shasta County
2. Total petroleum hydrocarbons, as gasoline, diesel, and oil and grease, TPHg, TPHd, and TPHo&g, Methyl tert Butyl Ether, MtBE, tert Amyl Methyl Ether, TAME
3. NA, no analysis.

Because the facility is now inactive, further surface water monitoring under the current Industrial Storm Water Permit is likely sufficient for closure and post-closure maintenance.

Monitoring and Reporting Program

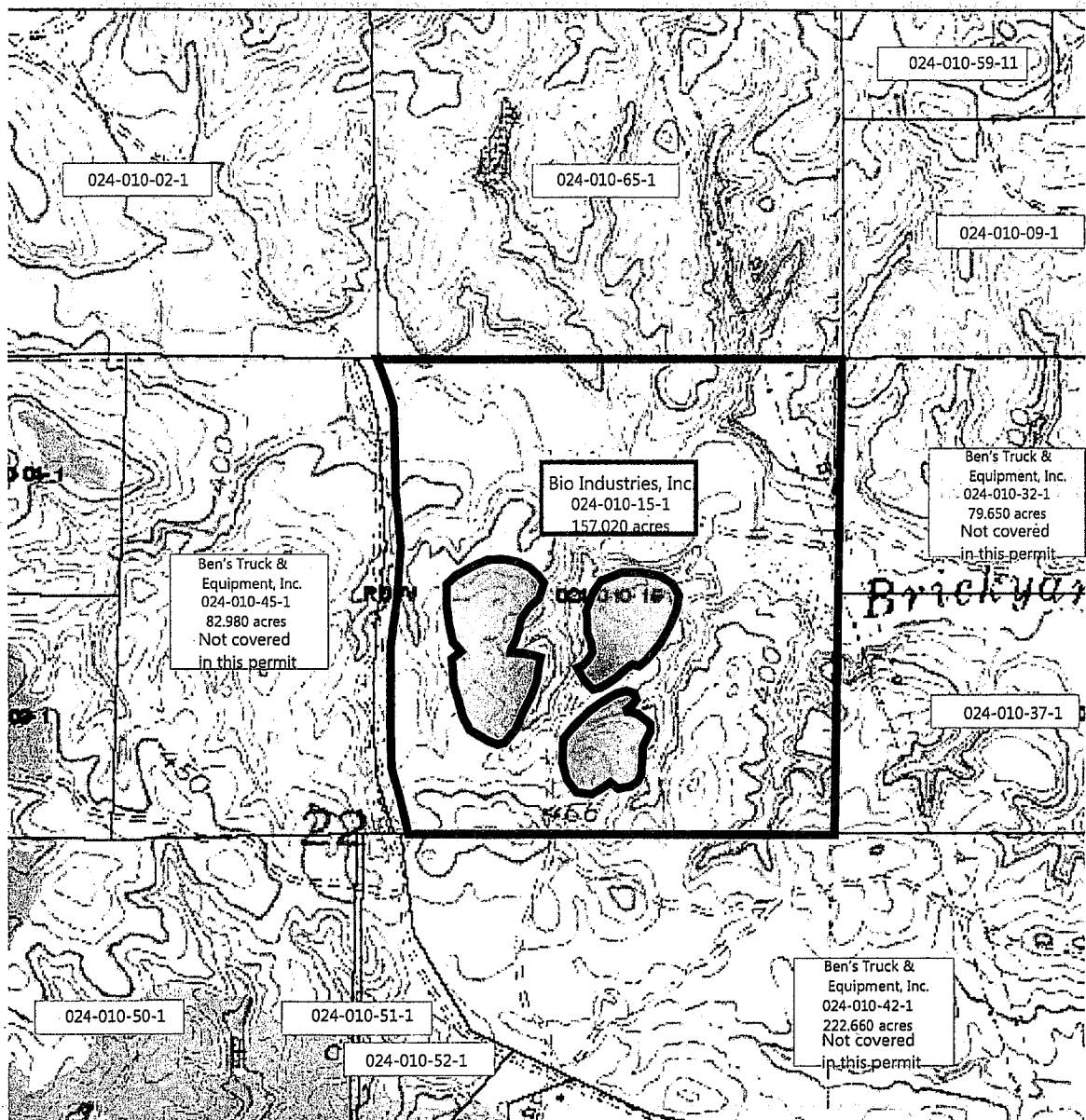
For closure and post-closure maintenance, the MRP requires a characterization in detail of the inert cell. To ensure that previous pre-screening of treated soils was adequate, and no remaining long term threat to human health and the environment remain, the characterization generally includes a tiered laboratory

analytical program based on field screening and results of EPA Method 8015 modified gasoline, diesel, and oil and grease. Follow-up analyses include volatile and semi-volatile organic compounds, poly-chlorinated biphenyls, and metals.

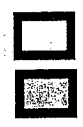
This MRP has increased monitoring of key petroleum constituents, now including some weathering products, major ions sufficient for Stiff and Piper Diagrams, and, as previously, metals common in automotive engine waste oil.

Based on likely non-representative analytical results of local groundwater and limited potential for impacts to groundwater from the cells, the MRP will likely require a relatively short compliance period of three years. However, if characterization of the inert cell indicates a remaining threat to groundwater and surface water, the MRP would require further long term monitoring. Constituents of concern would generally include metals sufficient to help explain major ion anomalies, volatile organic compounds commonly found in soil gas and with high mobility in water, and key semi-volatile organic compounds, common industrial pollutants with high mobility in water.

EJR: jmtm

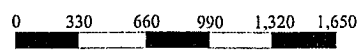


LEGEND



PARCEL BOUNDARY,
APN 024-010-15-1

FACILITY EXTENT
(APPROXIMATE)



FEET
BASE MAP SOURCES: ADAPTED FROM USGS 7.5" RED BLUFF QUADRANGLES
AND TEHAMA COUNTY TAX ASSESSOR'S OFFICE FILES

(R/16/10)

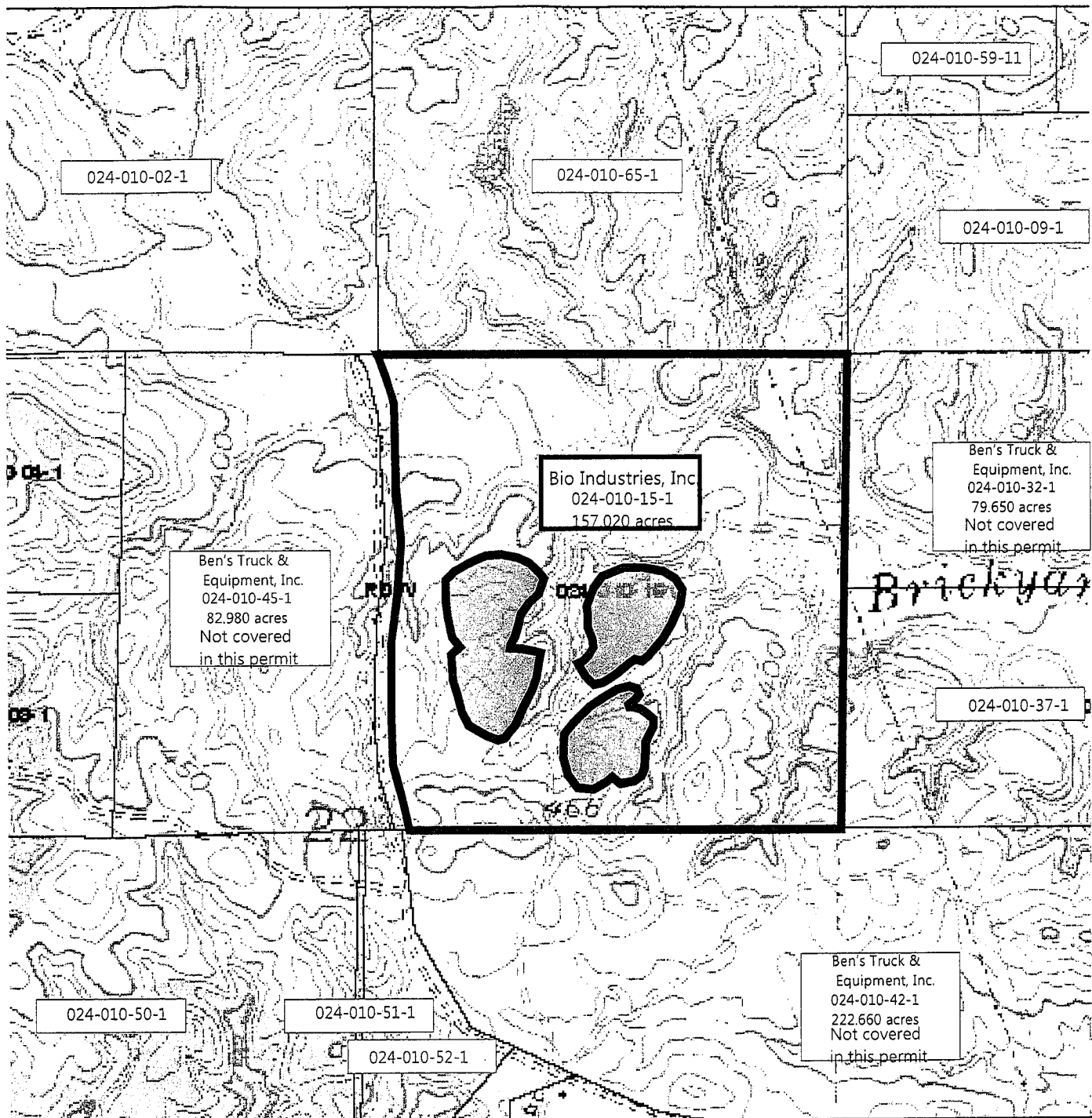
(EJR)

ATTACHMENT A

ORDER NO. R5-2012-0012

WASTE DISCHARGE REQUIREMENTS
FOR
BIO INDUSTRIES, INC.
BIO-REMEDIATION FACILITY FOR
PETROLEUM-CONTAMINATED SOILS,
TEHAMA COUNTY

LOCATION MAP



LEGEND



PARCEL BOUNDARY,
APN 024-010-15-1

FACILITY EXTENT
(APPROXIMATE)



0 330 660 990 1,320 1,650

FEET

BASE MAP SOURCES: ADAPTED FROM USGS 7.5' RED BLUFF QUADRANGLES
AND TEHAMA COUNTY TAX ASSESSOR'S OFFICE FILES

(8/16/10)

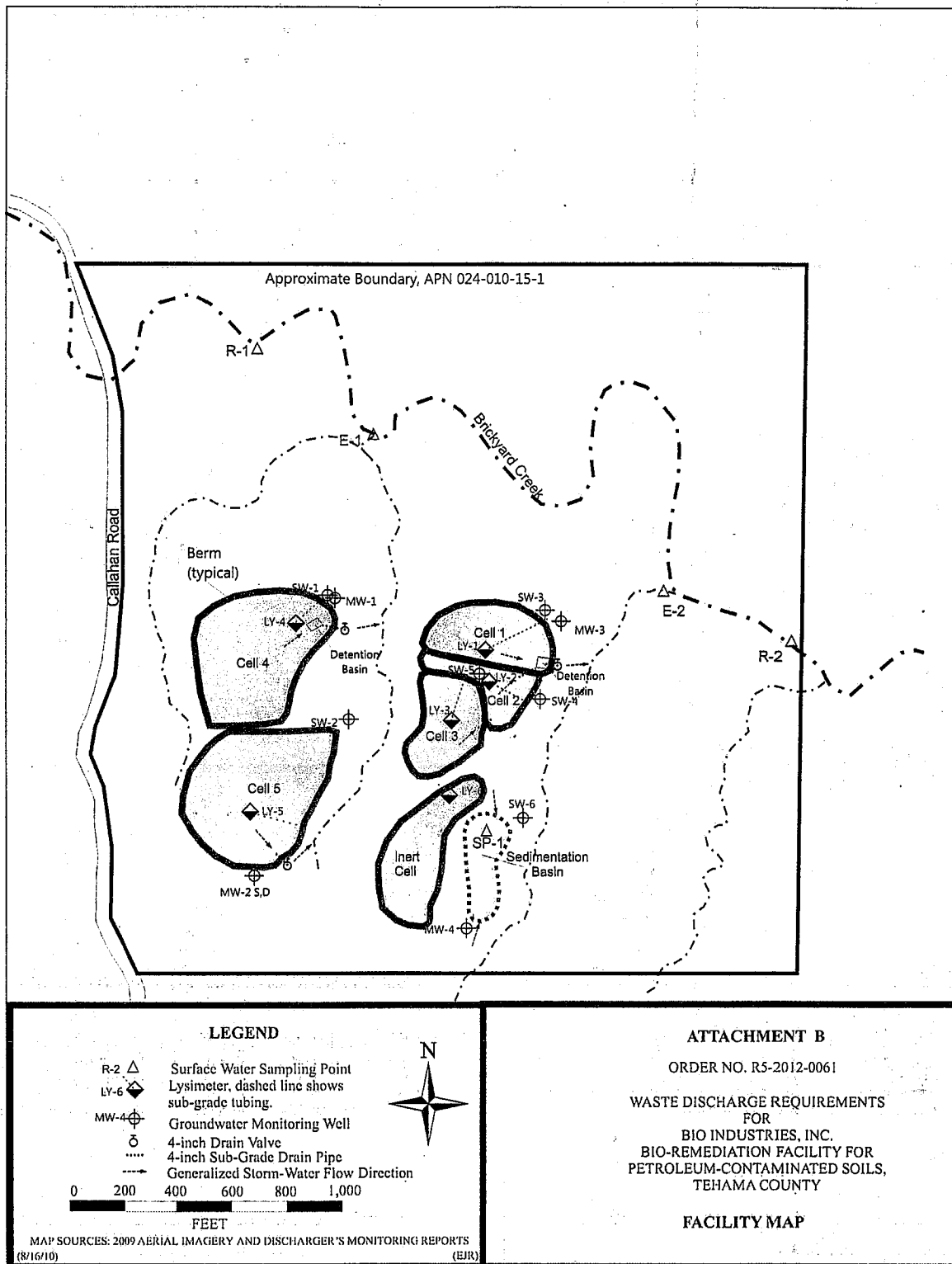
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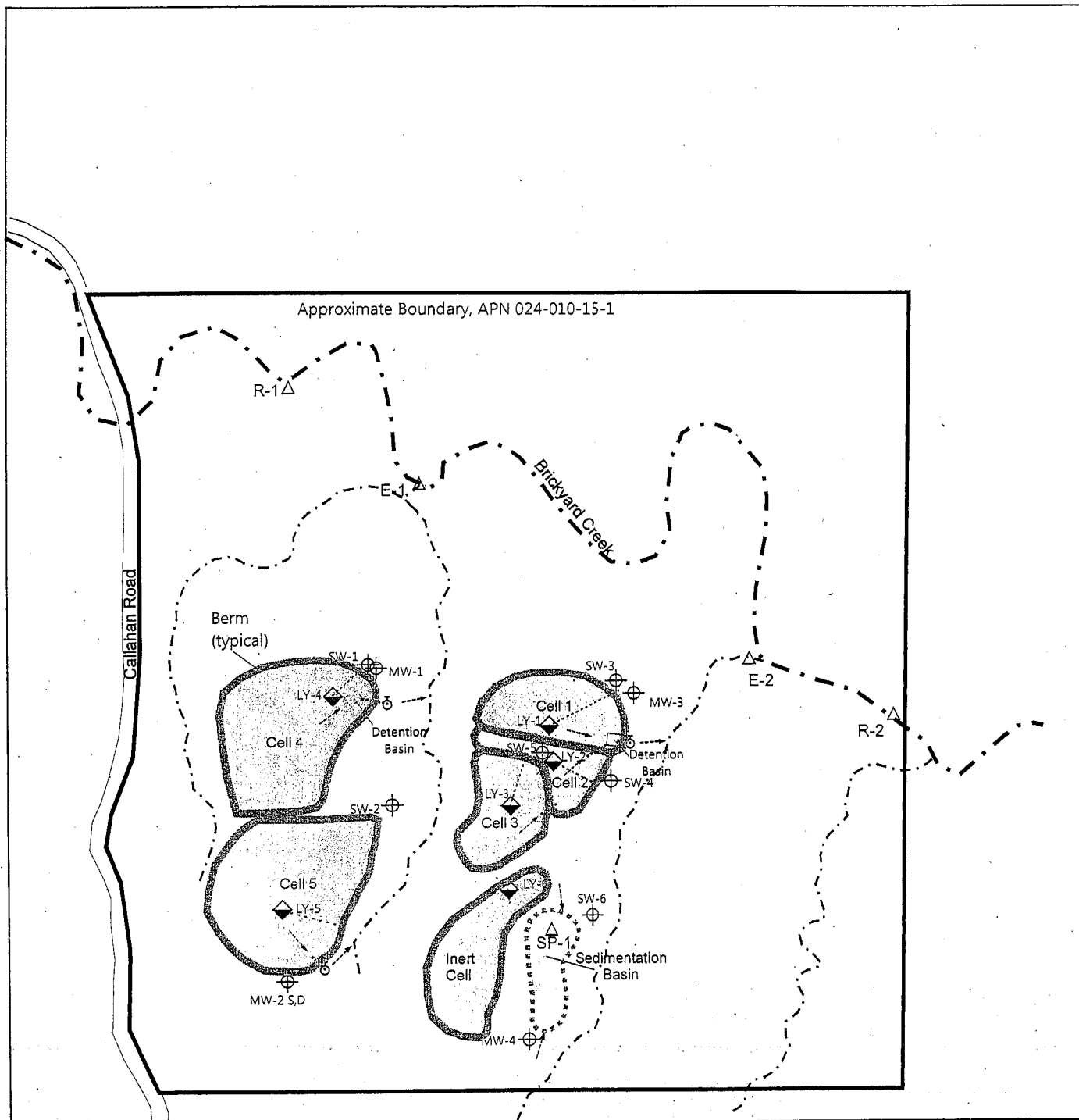
ATTACHMENT A

ORDER NO. R5-2012-0012

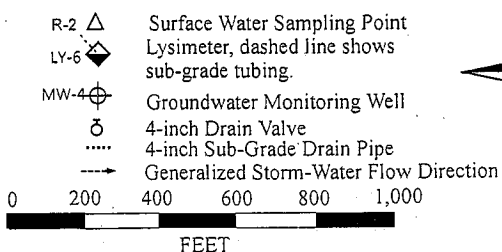
WASTE DISCHARGE REQUIREMENTS
FOR
BIO INDUSTRIES, INC.
BIO-REMEDIATION FACILITY FOR
PETROLEUM-CONTAMINATED SOILS,
TEHAMA COUNTY

LOCATION MAP





LEGEND



MAP SOURCES: 2009 AERIAL IMAGERY AND DISCHARGER'S MONITORING REPORTS
(8/16/10) (EJR)

ATTACHMENT B

ORDER NO. R5-2012-0061

WASTE DISCHARGE REQUIREMENTS
FOR
BIO INDUSTRIES, INC.
BIO-REMEDIATION FACILITY FOR
PETROLEUM-CONTAMINATED SOILS,
TEHAMA COUNTY

FACILITY MAP

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